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List 33

Sir Joseph Paxton
BIRKENHEAD
PARK

Sir Joseph Paxton

1803–1865

A centenary exhibition
organized in association with
the Victorian Society

Cumberland House Museum, Portsmouth
19 June - 10 July

Williamson Art Gallery, Birkenhead
17 July - 7 August

Derby Museum and Art Gallery
12 - 31 August

Graves Art Gallery, Sheffield
9 - 31 October

Arts Council Gallery, Cambridge
6 - 27 November

Arts Council Gallery, London
8 December - 8 January 1966

The Arts Council 1965

CONTENTS

Introduction	*page* 5
Biographical Note	8
Bibliography	10
Catalogue Note	10
I Paxtoniana	11
II Botany, Horticulture, Parks and Gardens	11
III Chatsworth	13
IV Conventional Buildings	14
V Glass Buildings	17
VI The Great Exhibition Building	18
VII The Crystal Palace at Sydenham	21
Index of Lenders	24
Plates	*facing page* 12

FOREWORD

At the suggestion of Professor Nikolaus Pevsner, President of the Victorian Society, the Arts Council has organized, in association with the Society, an exhibition devoted to the work and achievements of Joseph Paxton commemorating the centenary of his death.

We are most grateful to Dr George F. Chadwick, the author of *The Works of Sir Joseph Paxton*,* who has undertaken the selection of the exhibits and who has also written the catalogue. We also take this opportunity to thank all owners who have generously agreed to lend material for the exhibition, especially the Trustees of the Chatsworth Settlement without whose whole-hearted co-operation the exhibition would not have been possible, and Mr Alan R. Warwick who has lent a number of enlargements, many of photographs of Delamotte, which were shown in May last year in the Norwood Society's exhibition: *The Crystal Palace Story*: at the Crystal Palace Hotel, Upper Norwood.

G. W.

* The Architectural Press, London, 1961

INTRODUCTION by G. F. Chadwick, Ph.D, MA, BSc

Sir Joseph Paxton was a man of a type that somehow seems to have been produced by the particular circumstances of the first half of the nineteenth century: the self-confident professional embodying shrewdness, ability, and judgment with a willingness to take risks in extending knowledge or practice beyond conventional limits. We associate this type in post-Industrial Revolution England especially with the great engineers: Telford, the Stephensons, Brunel; with certain political leaders, and with captains of industry and empirical scientists. Paxton, at least superficially, was of this kind, and indeed might well have devoted his talents and interests to engineering if his circumstances had been different; he was a farmer's son, though, brought up in a wholly rural environment, and trained by practical means as a gardener, so that his interests and abilities were given direction from an early age; had he been born in Durham or Staffordshire or Lancashire it is probable that he would have developed interests and abilities closer to those of his later friends George and Robert Stephenson. But this comparison does not do Paxton entire justice, for the genius of the man lay not in his ability to specialize—although he developed specialization of certain kinds to a considerable degree of refinement—but rather in his ability to encompass a very broad field, and to do all within that field remarkably well. Nor is this all: not only can we distinguish between specialized and comprehensive ranges of ability, but we might distinguish also the application of the comprehensive ability to many different problems at once from its application solely to different problems at vastly different times. Paxton then was a man of wide ability who had the facility for carrying out or controlling operations of diverse kinds which were going on at the same time. For this writer, who sees the increasing specialization of education and lack of regard for comprehensive ability (which all human beings possess in some degree at least) as a positive menace to society, this is the most important aspect of the life and works of Sir Joseph Paxton, more fascinating even than the value of some of these works individually, great though that was in some cases.

A reference to the biographical note which follows will provide the evidence. Here was a man who was not only head gardener, forester and agent to the sixth Duke of Devonshire, but his financial adviser and friend; a man who was a top-rank botanist and also a promoter of a national newspaper; a builder of plausible rockworks, ruined aqueducts, and conventional stone buildings, and the designer of the largest and most revolutionary structures of their time: a Member of Parliament and an experimenter in natural physics; a promoter and director of railway companies, collieries, and docks, and a designer of public parks; a man interested in sanitary questions and playing a part in urban improvement works on several fronts whilst retaining the ability to organize fetes with elaborate fireworks and illuminations for a Queen or a Czar. This was Joseph Paxton, man of breadth, and above all of energy: 'little bustling Mr Paxton', the man who not only did things superlatively well, but saw to it that they were the right things and done at exactly the right time.

Both Paxton's ability and his energy, though, depended on a broad base derived from others, and upon two people above all: his wife Sarah, and his patron the bachelor Duke of Devonshire. To the Duke Paxton owed not only patronage but a very real addition to his education in the close contact with and appreciation of the treasures of Chatsworth that the Duke encouraged over a long period. In addition the Duke took him on the Grand Tour in 1838–9, apart from taking him to many of the great houses of this country at other times. The close contact with this cultivated man, encouraging him artistically as well as providing opportunities for enlarging his professional interests, was indispensable to Paxton's development as well as providing the basis for a deep respect and affection which lasted for thirty-two years.

Sarah Paxton was also of unique influence on her husband. It is likely that her dowry was the beginning of the considerable fortune that Paxton amassed (and partly spent), but, far more important, it was Sarah's ability to judge a situation coolly (especially a financial one) and to act responsibly that was to be the greatest help to her husband. It was Sarah who sat at home at Barbrook or in the estate office nearby attending to the day-to-day routine of Chatsworth life for Paxton, whilst he was ranging up and down the country or the Continent on his many interests. It was Sarah who in a very real sense managed his affairs at the Derbyshire end whilst Paxton

operated his Parliamentary career, business interests, and professional practice in London. Nor was Sarah a passive partner in their enterprises: although Paxton was very much the head of the concern the initiative on many things came from his wife and her approbation was always something to be sought by him. A growing family—eight children, five daughters and one son of which survived—constant attendance on estate and house duties at Chatsworth, and playing 'anchor man' in Paxton's business and professional team: this was no small feat, even for the able and intelligent woman that Paxton met on his first morning at Chatsworth and married six months later.

To carry further his many interests Paxton recruited others at various times and in various places: men to whom he could delegate responsibility at lower levels, but always in the end taking full responsibility on his own shoulders. The names of some of these men are lost now, or their parts only dimly seen, but several must be mentioned especially in relation to his landscape and building works. John Gibson, Edward Kemp and Edward Milner were amongst those whom Paxton trained in the gardens at Chatsworth and afterwards played supervisory roles in his landscape works, eventually becoming practitioners themselves. On the building side the estate staff at Chatsworth was supplemented by architectural assistants from time to time, who became involved in Paxton's private practice in some cases: John Robertson, Lewis Hornblower, and George Henry Stokes (who was to become his son-in-law and associate) were important at certain periods. But always it was Paxton who held the team together, who directed the programme and arranged the essentials, and who dealt with the client. In other ventures too, for example in organizing the Army Works Corps for service in the Crimean War, Paxton had to employ subordinates, but always he held the responsibility for the main decisions, and even the details of many operations came under his view, especially in his earlier enterprises.

Paxton's energy was exemplified by his travelling habits: he was a pioneer of railway investment and promotion, and became a railway contractor; he was at home with railways and on railways. A prodigious journey in September 1845 sets the key: from Sheffield to London, then to the Isle of Wight, back to London and then on to Derby, Derby to Birmingham, Cheltenham, Gloucester and Bristol, Bristol to Bath and back, Bristol to London, London to Eltham and back, London to Birmingham, then to Derby, and on to York—five nights, most of them out of bed, conducting business and meeting delegations, and 'never a moment even to write my own name'. Only this energy and ability to travel widely with the spread of the railway system made it possible for Paxton to conduct all his enterprises. In this way, too, Paxton became known to an increasing circle of businessmen, railway engineers and contractors, financiers, and men of affairs. His logistic ability impressed even the Duke of Wellington; his financial shrewdness brought him into close contact with the Rothschilds, to whom he became virtually family architect as well. He met dukes, princes, politicians and writers, but never forgot his own humble beginnings, organizing cheap travel for working men, providing work for the unemployed at Coventry, and seeing the Sydenham Crystal Palace above all as a serious instrument of education for the masses, not only as a pleasure resort and permanent exhibition centre.

It was the Great Exhibition Building, the first Crystal Palace, that brought him fame, although his personal fortune was then assured. The circumstances of his design for the great building being prepared and accepted lent a romantic air to this success, but apart from Paxton's inclination to play the showman which manifested itself in certain of his works, the affair of the Great Exhibition was really the capitalization of a long series of practical experiments in horticultural building which had already resulted in a prefabricated, modular constructional system of considerable versatility. It was this success, coupled with the snobbery of the architectural profession which resented the intrusion of one not trained conventionally into their territory in general, which engendered a somewhat hostile attitude to Paxton by the architects of the time; in fact he had few architect friends, choosing instead to look amongst his railway and business connections.

Paxton's conventional buildings are not generally remarkable: they fit the normal architectural attitudes of the period, just as Paxton's philosophy in general was of its time. (His political views were conventional, although he had the strength of mind to vote against his party with a few others at one time, bringing the Government down in doing so.) Likewise, although technically he was probably the greatest gardener of his century, outranking the later William Robinson, or even the prodigious John Claudius Loudon in his knowledge and skilled application of theory to practice, yet he did not introduce a new aesthetic philosophy to the landscape but rather was content to work in the accepted derivation of the Picturesque evolved earlier by Humphry Repton and modified to suit Victorian taste by Loudon. Paxton's greatest successes which remain to us today are

those landscapes which he new-made, like his public parks, or those which he modified richly, like that of Chatsworth. ('. . . there is no one whose name will be so permanently associated with Chatsworth as Paxton,' as the seventh Duke wrote after his death.) The brilliant logic of Paxton's glass buildings, from the smallest hand-frame to the magnificent project for St Cloud, will always attract the intellect and stimulate discussion of their merits in relation to changes in aesthetic philosophy in this century, but it may be that his work in advancing a number of public issues in a less spectacular way counted for more in the long run: public recreation, public sanitation, the improvement of communications, the dissemination of horticultural and botanical knowledge through his many publications. This is how some, at least, of his contemporaries saw Paxton at the time of his death, a century ago. Paxton, 'the genial gardener', was a man of many parts, and perhaps his ability in these diverse fields sprang in the first place from his recognition of the beautiful simplicity in variety, the ordered completeness of nature.

BIOGRAPHICAL NOTE

1803 Born at Milton Bryan, near Woburn, Bedfordshire, the seventh son of a farmer.
1818 Garden boy at Battlesden, Bedfordshire.
1820 Gardener at Woodhall, Watton, Hertfordshire.
1822 Back at Battlesden where constructs lake.
1823 Gardener to Duke of Somerset at Wimbledon. Foreman in the arboretum of the Horticultural Society Gardens at Chiswick. Meets the sixth Duke of Devonshire subsequently when he is strolling in the grounds, leased to the Society by the Duke.
1826 Offered post of Head Gardener at Chatsworth by the Duke of Devonshire. Moves to Chatsworth in May.
1826 Becomes Fellow of the Horticultural Society of London.
1827 Marries Sarah Bown of Matlock, niece of the Duke's housekeeper at Chatsworth.
1827 Birth of first daughter, Emily.
1828 First improvements to conventional glasshouses, Chatsworth.
1828 Takes part in laying out the grounds around the house at Chatsworth, with Wyatville, and builds the Orangery there.
1828 Birth of first son, William.
1829 Appointed Forester and plants the Pinetum at Chatsworth.
1830 Moves the mature Weeping Ash from Derby to the new forecourt at Chatsworth.
1831 Birth of second daughter, Blanche.
1831 Begins publication of *Horticultural Register* with Joseph Harrison.
1832 Birth of third daughter, Victoria.
1833 Rearranges waterworks at Chatsworth.
1833 Becomes Fellow of the Linnean Society.
1834 Greenhouses on ridge and furrow system at Chatsworth.
c. 1834 Experiments with heating and ventilation systems for hothouses.
c. 1834 Palm house at Loddiges' Nursery, Hackney.
1834 First number of Paxton's *Magazine of Botany and Register of Flowering Plants* appears.
1834 Visits Paris, Versailles, St Cloud with the Duke.
1835 Despatches John Gibson to India to collect new plants.
1835 At Dropmore, Windsor, Wilton, Longleat etc with the Duke.
c. 1835 Begins to invest in railway shares, becoming a member of the 'Liverpool Party' with Thomas Brassey, Thomas Hughes Jackson, George Wythes and others.
1835 Garden works at Chiswick House.
1835 Lays out the Arboretum at Chatsworth.
1835 Death of son William.
1836–40 Builds the Great Stove (Conservatory) at Chatsworth.
1836 Begins experiments with sash-bar machine at Chatsworth.
1836 Birth of second son, George.
1836 Awarded Knightian Silver Medal of Horticultural Society for introduction of the dwarf banana, *Musa cavendishii*.
1836 Garden works at Latimers, Buckinghamshire.
c. 1837 Conservatory at Capesthorne, Cheshire.
1837 Takes over estate roads at Chatsworth.
1838 Birth of fourth daughter, Laura.
1838 Member of Committee reporting on the condition of Kew Gardens.
1838 *Practical Treatise on the Cultivation of the Dahlia* published.
1838–9 On the Grand Tour with the Duke, visiting Switzerland, Italy, Malta, Greece and Turkey.
1838–42 Village housing and schools at Pilsley and Beeley, and the rebuilding of Edensor Village, Chatsworth.
1840 John Robertson joins Paxton as architectural assistant.
1840 Park Lodge, Baslow, begun by John Robertson.
c. 1840 Work on the Crescent Slopes, Buxton.
1840 Builds Cyclopean Aqueduct at Chatsworth.
1840 Birth of fifth daughter, Rosa.
1840 At Lismore, Co Waterford, with the Duke.
1840 *Pocket Botanical Dictionary* published (assisted by Dr Lindley).
1840 Awarded Silver Medal by the Royal Society of Arts for his sash-bar machine.
1841 Experiments with electricity.
1841 Begins the *Gardener's Chronicle* with Lindley.
c. 1841 Becomes friendly with Charles Dickens, and also the staff of *Punch*.
1842 Birth of sixth daughter, Annie.
1842 Constructs the rock works at Chatsworth.
1842 In contact with the sanitarian, Edwin Chadwick.
1842 Begins work on Prince's Park, Liverpool, for Richard Vaughan Yates.
1842 First rebuilding of own house, Barbrook, at Chatsworth.
1843 Begins work on Birkenhead Park.
1843 Extension and remodelling of Bolton Hall, West Riding, for the Duke.
1843 Queen Victoria visits Chatsworth. Paxton arranges illuminations.
1844 Builds Emperor Fountain and Emperor Lake at Chatsworth in six months.
c. 1844 Lewis Hornblower employed by Paxton as architectural assistant.
1844 Prepares plan for paying off the Duke's debts and sells Baldersley Estate to George Hudson, the railway promoter.
1845 Commissioned to lay out the Coventry Cemetery.
1845 Promoter of the *Daily News*, subscribing £25,000.
1845 Sells Londesbrough (Yorkshire) Estate to George Hudson for the Duke.
1845 Presented with Order of St Vladimir and gold cups by Czar Nicholas.
1846 In Germany and Austria with George Stephenson. Bribes workmen at Cassel to allow him to measure fountain jets, and meets the King of Bavaria.
c. 1846 John Robertson leaves Paxton's employment.
1847 Builds Burton Closes, Bakewell, for John Allcard, and lays out grounds.

1847 Terrace gardens at Tatton Park, Cheshire.
1848 Elected to directorships of the Furness Railway and the Midland Railway.
1848 Covering to Conservative Wall, Chatsworth.
c. 1848 Experiments on the use of sewage in promoting plant growth, Chatsworth.
1849 Appointed Agent to the Estates at Chatsworth.
1849 Flowers *Victoria Regia* Lily at Chatsworth.
1849–50 New Lily House, Chatsworth.
c. 1850 *Calendar of Garden Operations* first issued.
1850 Granted Patent for Roof construction system.
1850–1 Assists in the work of the Board of Health on Extra-mural Interment.
1850 *Paxton's Flower Garden* published, (with Lindley).
1850 Begins work on remodelling Lismore for the Duke.
c. 1850 Suburban layout adjoining Menai Straits in connection with Stephenson's Tubular Bridge.
1850 Designs stations and railway buildings at Matlock and Rowsley.
c. 1850 Alterations to gardens and woods, Lismore.
1850 Begins work on Mentmore for Baron Mayer Rothschild.
1850–1 Building for the Great Exhibition, Hyde Park.
1851 Designs (unbuilt) for Royal Exchange Court, and 'Sanitarium' at the London Chest Hospital.
1851 Design for Crystal Palace, New York.
1851 Second rebuilding of Barbrook.
1851 Knighted by Queen Victoria for work on the Great Exhibition.
1851–2 Alternative extension projects for Great Exhibition Building.
1852 Evidence to Committee on the Exhibition Building.
c. 1852 Extensions to Aston Clinton, Buckinghamshire, by Stokes for Sir Anthony de Rothschild.
1852–6 Re-erection of the Crystal Palace at Sydenham, Kent, layout of park and gardens and waterworks.
1852 Layout of The Park, Buxton.
1852 Takes lease of Rockhills, Sydenham, from Crystal Palace Company.
1852 Consulted by Glasgow Town Council on the laying out of Kelvingrove Park.
1853 First daughter, Emily, marries his architectural assistant George Henry Stokes.
1853 Appointed Justice of the Peace.
1853 Requested to prepare plans for the grounds of the Manchester Royal Infirmary.
1853 Restoration of St Anne's Church, Baslow, by Paxton and Stokes.
1853–9 House of Ferrières, near Paris, for Baron James de Rothschild.
1854 Elected Member of Parliament for Coventry.
1854–9 Organizer of the Army Works Corps for the Crimean War.
1854 Becomes Chairman of the Manchester, Buxton, Matlock and Midlands Junction Railway.
1854 Sees the Emperor Napoleon in Paris with the plans of the Sydenham Crystal Palace.
1855 Project for the Great Victorian Way, London, presented in evidence to Committee on Metropolitan Communications. Subsequently sees Prince Albert about his scheme.
1855 Designs the People's Park, Halifax for Sir Francis Crossley.
1855 Member of Official Committee on Barrack Accommodation for the Army.
1855 Death of daughter, Laura, in an accident.
1856 Contracts with Wythes and Brassey for the Smyrna and Aiden Railway.
1856 Rebuilding of Belle Vue, Halifax by Paxton and Stokes for Sir Francis Crossley.
1857 Re-elected MP for Coventry.
1857 Becomes a director of Brunel's *Great Eastern* company.
1857–60 Prepares design for Queen's Park, Glasgow.
1857–8 Design for the Spa Saloon and grounds, Scarborough.
1858 Death of sixth Duke of Devonshire at Hardwick. Paxton resigns his offices at Chatsworth.
1858 Invited to visit USA to advise Illinois Central Railway but unable to go.
1858 Contractor for Eastern Bengal Railway with Thomas Brassey and George Wythes.
1858 Design by Stokes for Château at Pregny, Geneva, for Baron Adolphe de Rothschild.
1858 Contractor for Bilbao and Miranda Railway with Wythes, Brassey and Bartlett.
1858 Sees Prince Napoleon with Edwin Clark and Wythes re African Railways. Afterwards in Frankfurt on Rothschild business.
1858 Granted Patent for Portable Glasshouse system.
1859 & 1861 Visits to Spain in connection with railway contracts.
1859 Extension to house, Tatton Park, by Stokes for Lord Egerton.
1859 Agreement with William Allcard in underwriting business.
1859 Re-elected MP for Coventry.
1859 Commissioned to design Baxter Park, Dundee.
1859 Supports G. G. Scott's Gothic design for the new Foreign Office.
c. 1860 A promoter of the Thames Graving Dock company.
c. 1860 Garden near the Bois de Boulogne, Paris.
1860 Evidence to the Select Committee on the Serpentine.
1860 Gives evidence to Select Committee on Masters and Operatives.
1860 Chairman of the Select Committee on the Thames Embankment.
1861 Organizes British workingmen's demonstration in Paris.
1861 Design for Palais de Cristal, St Cloud, Paris.
1861 A guarantor for the 1862 Exhibition.
1862 Becomes Chairman of the Dublin and Meath Railway Company.
1862 Promoter of Thames Embankment Act.
1862 Layout of the Weaponness Estate, Scarborough.
1862 Evidence to Select Committee on the Sewage of Towns.
1862 Design for Market Hall, Coventry.
1862 Rosa Paxton married to Charles Markham, Locomotive Superintendent of the Midland Railway, afterwards Managing Director of the Staveley Coal and Iron Company.
1864 Design by Stokes for Battlesden House, Bedfordshire.
1864 Invited to design the Public Park, Dunfermline.
1864 Design for suburban layout at Shepperton Park, Middlesex.

1864 Probable design for Hesketh Park, Southport, executed by Edward Kemp.
1864 Member of the Select Committee on Sewage (Metropolis).
1865 Resignation from Parliament.
1865 Death at Rockhills, Sydenham, June 8. Buried at Edensor.
1871 Death of Sarah Paxton, September 12.
1873 Paxton Memorial unveiled at Crystal Palace.

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The Army Works Corps in the Crimea by G. F. Chadwick, in *Journal of Transport History*, Vol VI, p. 129.

CATALOGUE NOTE

The works are listed in seven broad groups so that the development of works of a like kind can be followed. It is important to remember that works of quite different kinds were being carried on at the same time, and a general cross-reference to other activities can be gained from the Biographical Note above.

The exhibition includes original works, contemporary illustrations, and recent photographs. It is known that other original drawings survived into this century but have not been traced: it is hoped that others will come to light as a result of this exhibition.

Measurements are in inches; the height precedes the width.

The following abbreviations are used in the names of owners:
Devonshire Collections—The Trustees of the Chatsworth Settlement, Devonshire Collections at Chatsworth.
Markham Papers—Correspondence and other papers of Sir Joseph Paxton, formerly in the possession of Dr Violet Markham, CH, and now in the Devonshire Collections at Chatsworth.
L—Exhibited in London only.

I *PAXTONIANA*

1 Joseph Paxton, 1836, by Henry Perronet Briggs, RA (1792–1844) L
Lent by The Trustees of the Chatsworth Settlement

2 Sir Joseph Paxton, 1851
Plate I
Watercolour 19¼x14 by Octavius Oakley (1800–67)
Lent by T. W. Tallents, Esq.

3 The Paxton Memorial at Sydenham
Photograph by Dr G. F. Chadwick
The memorial was designed by Owen Jones (1809–74), the architect, a water colour alternative design being in the Victoria and Albert Museum. The marble bust was by W. F. Woodington (1806–93) and was unveiled in June 1873.

4 The Paxton Memorial in Coventry Cemetery, designed by Messrs Goddard & Son
(*The Builder*) Photograph

5 Bookplate of Sir Joseph Paxton, showing coat of arms
Lent by Dr G. F. Chadwick

6 Bookmark woven in silk at the Crystal Palace, showing head of Sir Joseph Paxton
Lent by Dr G. F. Chadwick

7 Photograph of a railway meeting, including Sir Joseph Paxton
A copy of a contemporary photograph (possibly a montage) of a group of railway directors, perhaps of the Midland Railway at Derby. Paxton is at the extreme left. Charles Fox is also present.
Lent by Mrs M. Hunt

8 Three Gold Cups presented to Paxton by the Emperor of Russia, 1844 L
15 x 9, 15 x 8, 16 x 8
Presented to Paxton by Baron Brunow on behalf of the Czar Nicholas, together with the Order of St Vladimir, to mark Paxton's efforts in connection with the Czar's visit to England in 1844. The Czar had intended to visit Chatsworth where Paxton had newly constructed the Emperor Fountain, named in his honour, but was received by the Duke at Chiswick instead.
Lent by Mansfield Markham, Esq

9 Two Army Works Corps papers
(*a*) Schedule of Agreements made with officers, foremen and men of the Army Works Corps delivered by Sir Joseph Paxton to the Accountant General, July 13, 1857.
(*b*) A schedule of books, vouchers and documents delivered to the Accountant General relating to the AWC by Sir Joseph Paxton (undated).
Lent by The Trustees of the Chatsworth Settlement

10 *Paxton's Magazine of Botany*, Volume I, 1834
The dedication is to Paxton's employer and patron, the sixth Duke of Devonshire.
Lent by Dr G. F. Chadwick

II *BOTANY, HORTICULTURE, PARKS AND GARDENS*

11 Knightian Silver Medal of the Horticultural Society, awarded to Joseph Paxton for the introduction of *Musa Cavendishii*
Dia. 1¾
Musa Cavendishii, a dwarf banana from China, had been introduced from Mauritius in 1829, the one plant surviving and being bought by Paxton and fruited by him at Chatsworth. Paxton exhibited it at the Horticultural Society in 1836, and later sent plants to Samoa where it flourished.
Lent by T. W. Tallents, Esq.

12 *Musa Cavendishii*: a coloured plate from *Paxton's Magazine of Botany*, Volume III, 1836, p. 51
Lent by Dr G. F. Chadwick

13 *Victoria regia* (now *amazonica*)—the underside of a leaf at the centre
(Royal Horticultural Society) Photograph
This giant water lily had been known since 1801 but was rediscovered by Sir Robert Schomburghk in British Guiana in 1837. Seeds were introduced to Kew in 1846, but it did not prosper there. Paxton obtained a plant from Sir William Hooker with leaves less than 6 inches in diameter in August 1849, and brought it to Chatsworth to a new heated tank. By October the leaves were over 4 feet across and in November it flowered for the first time, Paxton taking a leaf and a flower to the Queen. Within a year it had outgrown its tank twice and produced 112 flowers and 140 leaves. The structure of the lily leaf suggested to Paxton the structural system for the new house built to receive the expanding plant.

14 *Victoria regia* at Chatsworth: Paxton's daughter Annie on a leaf
(*Illustrated London News*) Photograph
An illustration showing the load-carrying ability of the lily's leaf demonstrated in a very practical fashion by Paxton in 1849, when Annie Paxton was seven.

15 *Cattleya Labiata*: a coloured plate from *Paxton's Magazine of Botany*, Volume IV, 1837, p. 121
An orchid characteristic of the many rare and exotic plants flowered by Paxton at Chatsworth.
Lent by Dr G. F. Chadwick

16 *A Pocket Botanical Dictionary* by Joseph Paxton, assisted by Professor Lindley, second edition 1849
Paxton acknowledges J. C. Loudon's authority in the enumeration of genera and species, but says: 'We rely greatly on our own rigid research into these matters, having been engaged in it for several years . . .' (Preface, p. vii, original date 1840.)
Lent by Dr G. F. Chadwick

17 The Terrace Garden, Tatton Park, Cheshire, by Paxton, 1847
(*Country Life*) Photograph
A present day photograph of the garden designed by Paxton for Tatton Egerton, and referred to in a letter by Sarah Paxton dated February 11, 1847. (Markham Papers.) The layout is typical of Paxton's formal gardening, derived from Italian precedents The Italian style of gardening had been popularized by Charles Barry after his stay in Italy, and adopted by J. C. Loudon and others. Paxton's interest in the Italian style was stimulated by his visits to the great Renaissance gardens of Italy when on the Grand Tour with the Duke in 1838–9, and his later predilections were towards a combination of this style with the 'English' or 'Picturesque' as modified by Humphry Repton.

G. H. Stokes added an upper storey to the west wing at Tatton in 1860 (S.P. to J.P. November 8, 1859, Markham Papers).

18 The Rockworks, Chatsworth, 1842
Plate III
(The Architectural Press) Photograph
A photograph of the massive rockworks contrived by Paxton on a featureless slope, and now covered by a century of growth. The rock gardens include a reproduction of the Strid, a natural river-gorge at the Duke's West Riding seat of Bolton Abbey. The Duke commented in his *Handbook to Chatsworth and Hardwick*: 'The spirit of some Druid seems to animate Mr Paxton in these bulky removals.'

19 Paxton in his garden at Rockhills, Sydenham, *c* 1860
Photograph by courtesy of Miss Persis Tallents
Paxton leased Rockhills, adjoining the Crystal Palace, from the Crystal Palace Company, and made it his London base for over 10 years, dying there in 1865. The house was not built by him, but he modified the grounds, which seemed to have displayed rather more horticultural talent than taste. Paxton is the right hand figure in the group.

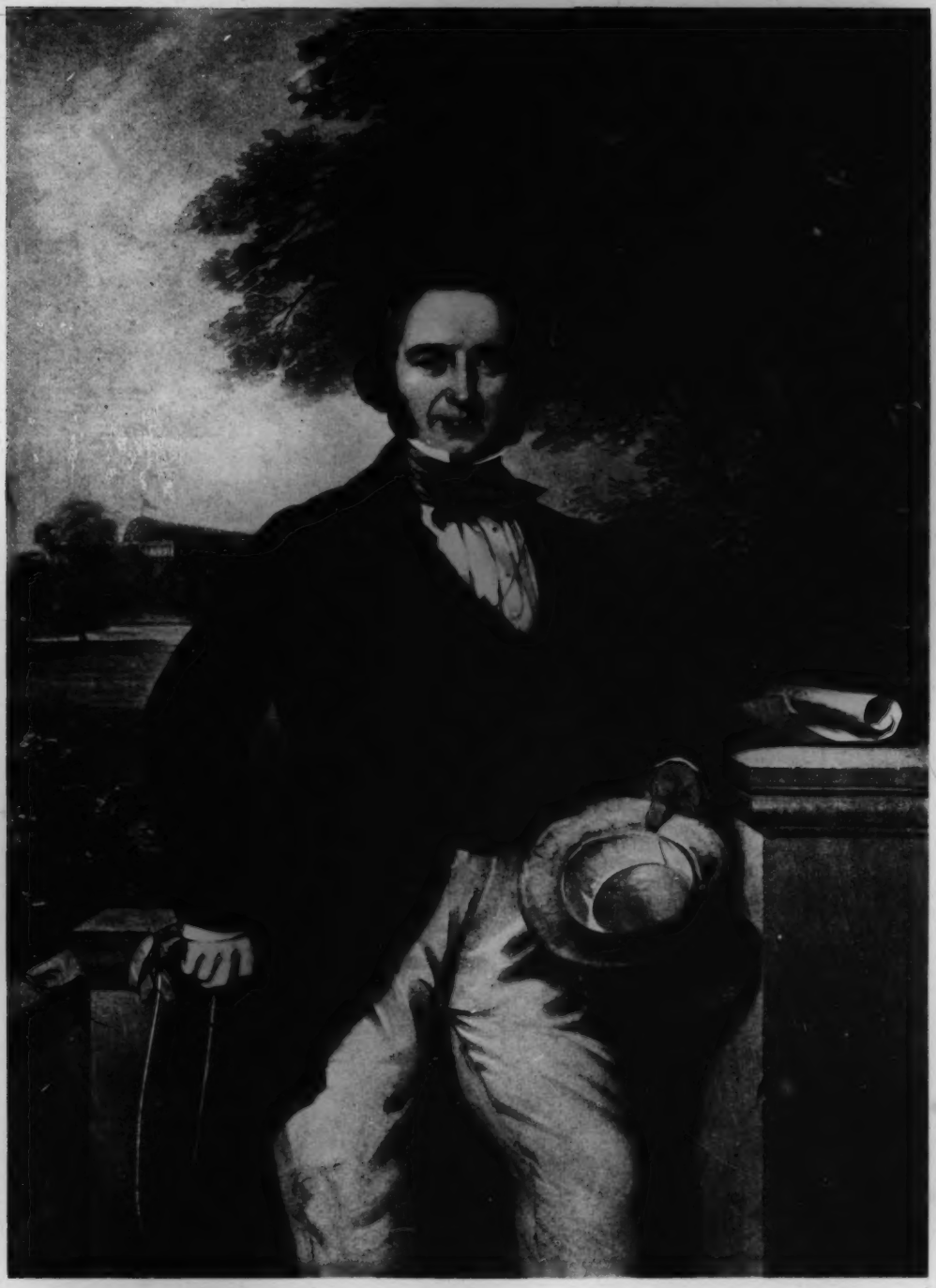
20 Paxton on his verandah at Rockhills, *c* 1860
Photograph by courtesy of Miss Persis Tallents

21 Rockhills, Sydenham
Photograph by courtesy of Miss Persis Tallents

22 Plan of Princes Park, Liverpool (undated), lithograph by C. Hullmandel after a drawing by John Robertson
19½ x 27¾
Princes Park was designed by Paxton for Richard Vaughan Yates in 1842. (Yates to Paxton, January 24, 1843, Markham Papers.) James Pennethorne, whose name appears with Paxton, seems to have advised on the architectural aspects of the scheme, whilst Foster and Stewart, and A. and C. Williams were responsible for leasing sites and general supervision. The park was originally private, but is now a public park. The Doric entrance lodge at the main (north) gate was bombed in 1940.
Lent by Liverpool Record Office

23 Plan of Birkenhead New Park, hand-coloured lithograph by Hullmandel & Walton, after a drawing by John Robertson
24 x 36½, Photostat copy
Paxton began work on the park in 1843 and it was formally opened in 1847: the first park freely accessible to the public provided out of public funds. The cost of the land and its laying out were more than covered by the return from the sale of land for building around the perimeter of the public area of the park. The site was originally poor, swampy land, and was drained and improved by Paxton, a circumstance commended by Edwin Chadwick of the Board of Health. The great crescents and terraces of Paxton's layout did not materialize, but a number of entrance lodges were provided by Paxton by 1845. Birkenhead Park much influenced Frederick Law Olmsted in 1852 and again in 1858 when he was working on his successful design for Central Park, New York, with Calvert Vaux.
Lent by Liverpool Record Office

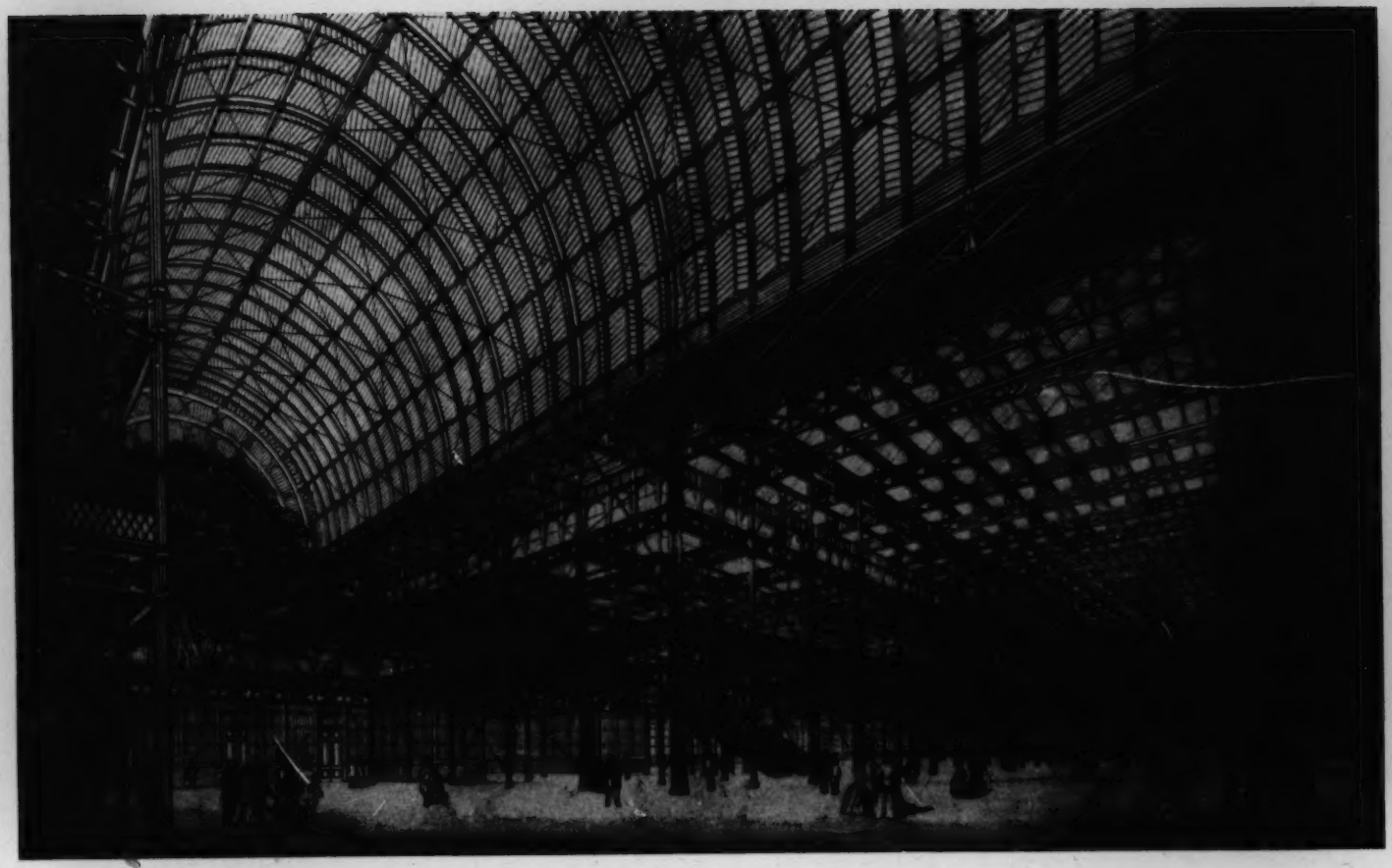
24 The Lower Lake and Swiss Bridge, Birkenhead Park
Photograph by Edward Hubbard
The bridge is one of three built by Paxton. The lakes were surrounded by mounds raised from the spoil dug from the lakes. Edward Kemp was Paxton's assistant for the landscape work, becoming Park Superintendent afterwards.



1 Sir Joseph Paxton, 1851. *Watercolour* (No. 2).

11 Recent airview of Chatsworth (No. 40).

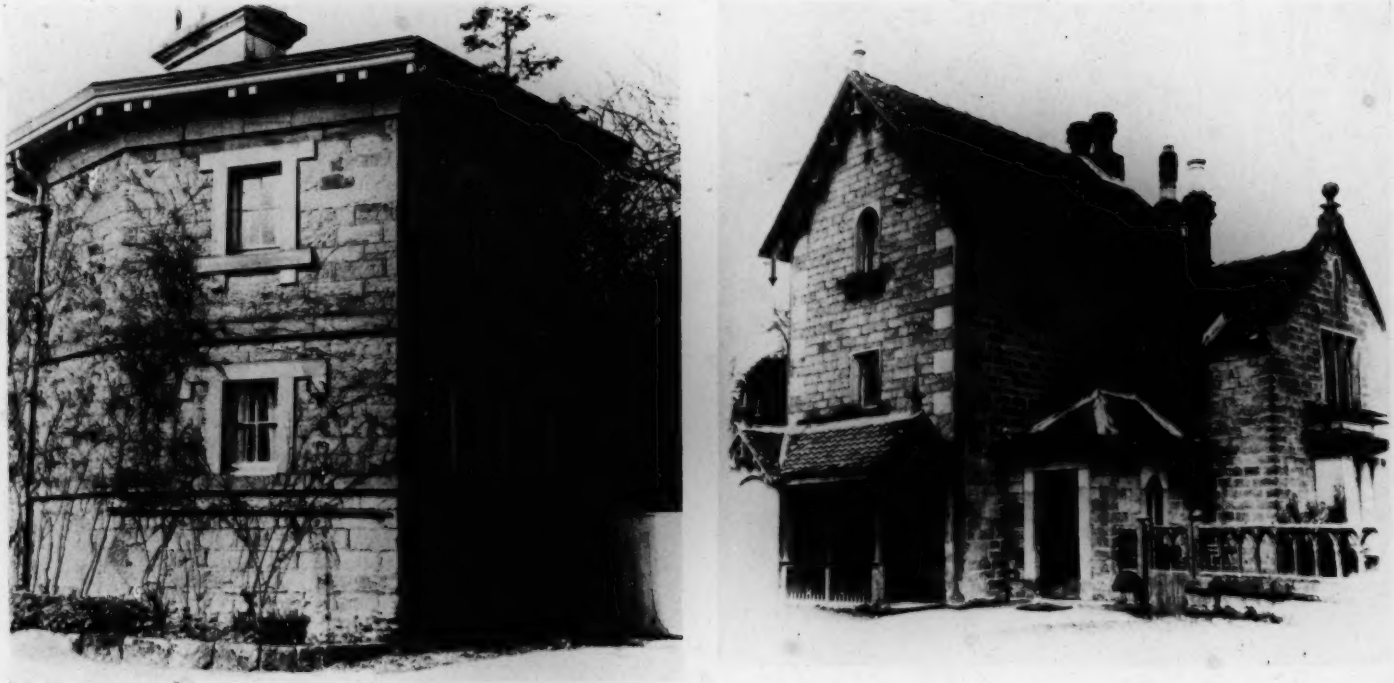
111 The Rockworks, Chatsworth, 1842 (No. 18).



IV Interior of Great Exhibition building, 1851. *Engraving* (No. 102).

v The Great Stove, Chatsworth (No. 77).

VI Mentmore, Entrance Court. *Engraving* (No. 55).



VII Two houses at Edensor, designed by Paxton, 1832–42 (No. 44).

VIII View of the Crystal Palace seen from Anerley Hill (No. 140).

25 The main entrance to Birkenhead Park
Photograph by Edward Hubbard

26 Central Lodge, Birkenhead Park
Photograph by Edward Hubbard
One of the more restrained of the Birkenhead Lodges, built *c.* 1844–5. Lewis Hornblower and John Robertson were Paxton's architectural assistants for the work at Birkenhead.

27 Norman Lodge (west), Birkenhead Park
Photograph by Edward Hubbard
The derivation of the name of the Lodge does not seem to be from its style!

28 Detail of Castellated Lodge, Birkenhead Park
Photograph by Edward Hubbard
Another building very much in the Edensor tradition.

29 Entrance to Coventry Cemetery
(Coventry City Library) Photograph
A copy of an engraving showing the main entrance by Paxton and Robertson, built in 1846, before Robertson left Paxton's employment. The stylistic links with work around Chatsworth is evident. Coventry Cemetery was much admired and recommended as an example worthy of emulation by the Board of Health under Edwin Chadwick in 1850.

30 View in Coventry Cemetery including the Episcopal and the Dissenters' Chapels
(Coventry City Library) Photograph
The Builder (1865) credits G. H. Stokes with the design of the chapels.

31 Upton Park, Slough
Photograph by P. C. Luff
A photograph of an engraving presumably issued in connection with the sale of villa plots after Paxton laid out the Park *c.* 1842.

32 Local Board Plan of the Town and District of Buxton by Henry Bake, 1859
55 x 75
This survey shows what must have been the original road layout of The Park, Buxton, begun by Paxton in 1852. No plan of Paxton's proposals has survived, but it seems likely that it would include terraces and crescents as well as villas, especially in view of the existence of John Carr's Crescent and the terrace of Hall Bank not far away. The Dukes of Devonshire have been considerable landowners in Buxton for a long period and have promoted the town's development in many ways.
Lent by the Borough Engineer, Buxton

33 View of The People's Park, Halifax
(*Illustrated London News*) Photograph
A general view of the 12 acre park across the small informal lake, with the 'handsome retiring saloon' designed by Stokes in the background, covering a statue of Sir Francis Crossley, MP, who donated the park to the town in 1857. At the far right is Crossley's mansion, Belle Vue, rebuilt by Paxton and Stokes at the same time.

34 The Pavilion, Baxter Park, Dundee
(*Illustrated London News*) Photograph
Designed by Paxton, 1859

35 Plan of The Queen's Park, Glasgow, dated March 7, 1860
27 x 40
Paxton was invited to advise Glasgow Corporation for the second time in 1857, having previously given a design for Kelvingrove Park in 1854; neither Kelvingrove nor Queen's Park were carried out as Paxton originally intended. An important feature of both parks was to be the Winter Garden: a combined museum, art gallery, promenade, refreshment room and conservatory, fronting a formal terrace, as shown in the vignette on this drawing.
Lent by Corporation of the City of Glasgow

III *CHATSWORTH*

36 Chatsworth and Park: a lithograph on stone by M. & W. R. Lambert from the painting by H. Emmerson (*d* 1895)
22¼ x 30
Lent by Rupert Allcard, Esq, OBE

37 MS Sheets endorsed: Questions asked by the Duke and (answered) by Mr Paxton (no date) NOT EXHIBITED
(Markham Papers)
This relates to the preparation by the Duke of Devonshire of his *Handbook* (see next item) and includes the revealing passage by Paxton himself of his arrival at Chatsworth and his first meeting with Sarah Bown.
Lent by the Trustees of the Chatsworth Settlement

38 *Handbook to Chatsworth and Hardwick* by the sixth Duke of Devonshire, privately printed, 1845
The Duke's own account of Chatsworth and its treasures at the time of fruition of the many improvements to house and gardens which had been planned by the Duke and Paxton over twenty years.
Lent by The Trustees of the Chatsworth Settlement

39 Plan of the gardens and surroundings of Chatsworth, 1858
46x81
A record of state of the Chatsworth gardens at the time of the sixth Duke's death, and the end of Paxton's official duties there as Head Gardener, Forester, and Agent. Amongst other details, the service arrangements to the Great Stove (see later) can be seen.
Lent by The Trustees of the Chatsworth Settlement

40 Two recent airviews of Chatsworth, from the south and north-west
Plate II
(Airviews, Manchester) Photographs
The Emperor fountain can be seen playing (to a reduced height) in the Canal Pond. The site of the Great Stove is marked by the formal garden in the Arboretum, uphill from the Canal Pond. The west front formal layout by Wyatville and Paxton, the East Walk, and Weeping Ash in the forecourt can also be seen.

41 The Cyclopean Aqueduct, Chatsworth
(The Architectural Press) Photograph
The ruined aqueduct was based on an earlier example at Wilhelmshohe, itself a copy of Roman aqueducts surviving in the villas of Frascati which Paxton may have seen; it was built by Paxton circa 1840 as a part of a system of rockworks and streams arranged by him on the hillside high above the formal cascade.

42 Edensor Village, Chatsworth
(The Architectural Press) Photograph
Edensor, like many other estate 'model' villages, was rebuilt out of sight from its owner's house: an activity that was common in the eighteenth century, but less so in the nineteenth. Paxton began work on Edensor in 1838 by moving tenants to new or temporary housing at the villages of Beeley and Pilsley nearby. Many of the existing houses were removed entirely, but some were refaced or re-roofed. The new village, in a sheltered side valley, has a loose and charming tree-fringed layout and includes a complete compendium of architectural styles then regarded as highly suitable, together with a few which seem to be of Paxton's own invention. The Church was intended to be rebuilt in 1844 as part of the scheme, but was deferred due to the sixth Duke's financial difficulties; it was rebuilt finally by the seventh Duke.

43 Village Housing at Edensor
(The Architectural Press) Photographs
An example of the eclectic variety of Edensor: the Norman cottage and a more straightforward Gothic villa.

44 Four Houses at Edensor, designed by Paxton, 1838–42
Plate VII
(The Architectural Press) Photographs

45 Plan of Chatsworth and Edensor
(Adapted from the Ordnance Survey)
The layout of Edensor village can be seen (left), and the general relationship of Paxton's works to the house and park.
Lent by Dr G. F. Chadwick

46 Emperor Fountain, Chatsworth: notes made by Paxton concerning the construction of the fountain and its supply, with diagrams.
Paxton was much interested in water works and used fountains and water-displays in his gardens wherever he could contrive the opportunity—and the funds. His hydraulic interests were stimulated by visits to Tivoli and Caserta when on the Grand Tour, and on his return, after work on the Great Stove and Edensor had been completed, he turned his attention to the possibility of constructing the highest fountain jet in the world, a project rendered practicable by the topography of Chatsworth. It involved the creation of a new conduit 2½ miles long, the Emperor Stream, to supply a new lake 350 feet above Chatsworth itself, and a 15 inch iron pipe from the lake to the fountain jet. The jet was placed in the existing Canal Pond to the South of the house, and was intended to play for the first time when the Emperor of Russia visited Chatsworth in June 1844.

47 Emperor Lake, Chatsworth
Photograph by Dr G. F. Chadwick
The Emperor Lake involved the moving of 100,000 cubic yards of soil and the building of a 550 yard masonry dam on the hillside, the lake surface being 8 acres.

IV *CONVENTIONAL BUILDINGS*

48 Park Lodge, Baslow
(The Architectural Press) Photograph
Park Lodge was begun in 1840 and finished in 1842 at a cost of £2,771 16s 0d, for Mr Condell, the Duke's physician, an entry in the Chatsworth accounts for July 4, 1842 showing that John Robertson was paid £75 'for making plans and superintending the work'. Robertson was Paxton's architectural assistant, perhaps his first one; he had been employed by J. C. Loudon as an architectural draughtsman from 1829 and had drawn many of the designs in Loudon's *Encyclopaedia of Cottage, Farm and Villa Architecture* (1833 and 1846). He worked at Chatsworth from 1840 until 1846, when he seems to have been dismissed. Robertson was employed clearly as a subordinate, working on Edensor under Paxton's direction, and on other works of the early 'forties: Bolton Hall, estate housing at Chatsworth generally, the early public parks and the Coventry Cemetery, and perhaps at Burton Closes.

Park Lodge is an excellent example of Paxton's predilection for Italianate villas, here perhaps having the general aim of harmony throughout the estate, with the Palladian elegance of the west elevation of Chatsworth itself setting the key. The tall, narrow, often coupled and often round-headed, windows occur in many of Paxton's smaller works.

49 A pencil drawing of Mr Paxton's house, Chatsworth, Derbyshire
Photograph by courtesy of Miss Persis Tallents
Paxton's first cottage in the Kitchen gardens at Chatsworth.

50 Mr Paxton's house and offices: two elevations, one section, one plan and three details
pen and ink, *c.* 1850–1
It appears that Paxton began altering his cottage *c.* 1842–3 with Robertson assisting, the work being financed by the Duke although no record was made in the Chatsworth accounts. The drawings shown relate to the second period of rebuilding, the Duke contributing £1,000 specifically for the house on March 25, 1851: 'Gave Paxton £1,000 towards house and offices for his innumerable benefits to me. Enchanted with Paxton.' (Sixth Duke's *Diary*: Devonshire Collections.) The tower of Barbrook was increased in height by one storey in the building. The house was demolished recently, due to dry rot. Paxton had been allowed to live in it by the seventh Duke, after the sixth Duke's death, and Sarah Paxton died at Barbrook in 1871.
Lent by The Trustees of the Chatsworth Settlement

51 Barbrook: two views of the house in Paxton's time
A copy of two photographs formerly in Paxton's possession, by courtesy of Miss Persis Tallents

52 Barbrook: details of the dining room decoration
Photographs by Edward Hubbard
Two photographs, one of an alcove, and one of the ceiling of Barbrook, taken before its demolition, and believed by Mrs Elfrida Mostyn to be the work of John Crace, the well-known decorator. Crace worked on several of Paxton's buildings for the Duke, for example at Bolton Hall, and Sarah Paxton mentions part of Barbrook being decorated 'a la Crace' in a letter to her husband. The initials of Paxton's children are used in the monogram on the ceiling.

53 Burton Closes, Bakewell: oil painting, *c.* 1845
23x37
A painting, presumably done for John Allcard, of the house designed for him by Paxton in 1846. The Allcard family were well-known to Paxton, and George Allcard married Victoria Paxton in 1857, whilst Paxton was associated with William Allcard in a business enterprise in 1859. Paxton appears to have carried out the building of Burton Closes and also laid out its park, whilst A. N. W. Pugin decorated the interior in characteristic manner.
Lent by Rupert Allcard, Esq, OBE

54 Burton Closes in its hey-day
Photograph by courtesy of W. J. Taylor-Whitehead, Esq.
This view of the south range shows how an addition was made to Paxton's earlier design, the conservatory with its characteristic Paxton ridge-and-furrow roof being built further to the west. The style of the new work is markedly different from the earlier, main block of the house. The house still survives, and has been the subject of recent, detailed investigation by Mr Edward Hubbard. Much of the Pugin interior work was sold, and the north (servants') wing demolished.

55 Plans, elevations and sections of Mentmore, Buckinghamshire, the seat of Baron Mayer A. de Rothschild, commenced August 1851, published London, 1866
15x11 *Plate VI*
A book of lithographed plates showing Paxton's designs for Mentmore, and presumably made from the original drawings. Paxton began work on his designs for Mentmore in 1850, and the house forms a fascinating contrast with the Great Exhibition Building conceived at the same time. The design of Mentmore is taken from Wollaton, near Nottingham, by Robert Smythson (*c.* 1585) who also built Hardwick: the great keep-like central chamber of Wollaton is omitted, however, and the central court roofed over in glass. Paxton also created a new park to set off the mansion, the whole composition of house and park being one of his finest achievements—and his most lasting.
Lent by the Victoria and Albert Museum

56 Mentmore: south elevation
(National Buildings Record) Photograph
The wing to the right is the conservatory.

57 Mentmore: entrance court
(National Buildings Record) Photograph
The service quarters, also arranged around a courtyard, are to the right (north) and are slightly lower than the main block.

58 Mentmore: plan of ground floor
(*The Builder*) Photograph

59 Plans, elevations, sections and views of Baron James de Rothschild's Mansion at Ferrières, (Seine et Marne) France
Two vols. bound in red morocco: 14¼x18¾ (plates 10¼x14)
These volumes contain two watercolour views of the house, three floor plans, four elevations and two sections through the building.
Ferrières was designed *c.* 1853, preliminary work starting in 1854 and Paxton laying the foundation

stone in July 1855; the house was completed in 1859. The work was carried out by an English contractor, Myers of Lambeth, who also built Mentmore, and English workmen were employed for certain parts of the building. The internal decoration was by the painter Eugène Lami (1800–90), and it is said that he advised on the towers also. The plan of Ferrières is similar to that of Mentmore in being a hollow square with four corner towers, although the French mansion is larger.

Lent by Baron Guy de Rothschild

60 Rothschild Mansion at Ferrières

Three watercolours, 16¼x28¾ each

These views show an alternative design to that actually built.

Lent by Baron Guy de Rothschild

61 View of Lismore Castle, Ireland, as restored by Sir Joseph Paxton and Mr G. H. Stokes

(*The Building News*) Photograph

Work on the rebuilding of Lismore Castle, County Waterford, for the sixth Duke, began in 1850 and continued until it was stopped by the death of the Duke in 1858. Lismore was in a ruined state, apart from the eastern wing, when work began, and the apartments around the central courtyard were completed before work on raising the various towers began *c.* 1853. The largest, the Carlisle Tower, was begun in 1855 and is 140 feet high to the battlements, surmounted by 30 feet turrets. Stone for windows and dressings was quarried near Chatsworth and taken by sea to Ireland, the work there being carried out by direct labour under John Brown, one of Paxton's Clerks of the Works. Other work on the Duke's estate at Lismore were carried out during the same period.

62 Belle Vue, Halifax, Mr George Henry Stokes, Architect

(*The Building News*) Photograph

As a result of Paxton's commission to lay out The People's Park at Halifax, Sir Francis Crossley engaged him to extend and rebuild his house Belle Vue, which overlooked the park. Belle Vue was first built *c.* 1846 and work started on its remodelling in 1856. George Henry Stokes, Paxton's associate and son-in-law, showed a design for the house at the Royal Academy in 1857 and it seems that he was mainly responsible for the design.

63 A design in French Gothic style by G. H. Stokes

(The Architectural Press) Photograph

G. H. Stokes' sketch book *c.* 1853–6 (Markham Papers —see later, item 67).

It seems likely that this sketch was an alternative design for Belle Vue, the size of the house and its general arrangements corresponding closely.

64 The Spa Saloon Music Hall, Scarborough from the designs of Sir Joseph Paxton and Mr George Henry Stokes

(*The Building News*) Photograph

Paxton was invited to advise the Scarborough Cliff Bridge Company in 1856, and prepared proposals for rebuilding the existing Spa buildings (dating from 1837) and improving the grounds in 1857. A new saloon was suggested to the south of the existing one, with a colonnade along its front linking the two and leading to a prospect tower. A new access road giving carriage access to the Spa at sea level in place of the Cliff Bridge was also proposed. The works were completed in 1858. The style of the new building was close to that of certain small scale works in Paxton's later public parks, although his fondness for round-headed arches is noticeable. Constructionally the Saloon was more interesting, with its laminated wooden trusses, ridge and furrow glass roofing to the refreshment area, and the use of hollow columns to take off rainwater. The building was subsequently destroyed by fire.

65 The new Music Hall, Scarborough, south front, drawn by J. N. Carter and lithographed by F. Jones

Undated, 16¼x14

A contemporary lithograph showing the terraces around the Spa Saloon.

Lent by Dr G. F. Chadwick

66 Front and Back views of house at Pregny, Geneva, for Baron Adolphe de Rothschild, by G. H. Stokes

Original, ink on tracing paper, 1858.

These two sketches appear to be early proposals for the fourth major work done by Paxton and Stokes for various members of the Rothschild family. Stokes, who had visited Geneva in 1860, exhibited a drawing of Pregny at the Royal Academy in 1864, but only the sketches shown here seem to have survived, in a family scrapbook.

Lent by Miss Persis Tallents

67 Sketch book by George Henry Stokes, *c.* 1853–56, bound mottled cover

10¼x7, 46 pp

Markham Papers

Contains a number of sketches of Chatsworth and its surroundings, and of various buildings, some of which are dated. It appears to have been used by Stokes both for sketching for pleasure and as a record of preliminary ideas for various houses.

George Henry Stokes was born in December 1826 at Nottingham and was a pupil of G. G. Scott (1811–78). He seems to have come to Paxton *c.* 1846, possibly as a replacement for John Robertson, and worked on a number of Paxton's buildings as an assistant. He married Emily Paxton in 1853, and, perhaps as a consequence, became Paxton's architectural associate. He did not practise independently, even after Paxton's death, apart from completing the commissions at Pregny, and on

Battlesden, Bedfordshire, for Sir Edward Page-Turner. Paxton appears to have secured the commissions for the architectural side of his professional activities and generally to have acted as head of the firm, with Stokes being responsible for detailed aspects of design within a general brief from his father-in-law. Towards the end of Paxton's life it is probable that Stokes took on a role of greater responsibility as Paxton grew both more busy and physically less able to deal with many matters. There is undoubtedly a change in style from Paxton's earlier conventional buildings to his later ones, but this is partly due to the unsuitability of his Italianate cottage style for very large and imposing mansions. Stokes—if his sketch book and his pupilage is any guide—seems to have had a taste for Gothic, like his first master, and undoubtedly would have built more in this style had he been given full reign. He died in 1874 at Darley Dale, Derbyshire.
Lent by The Trustees of the Chatsworth Settlement

68 A villa design in Gothic style, from G. H. Stokes' sketch book
(The Architectural Press) Photograph
A characteristic design by Stokes showing the influence of G. G. Scott.

V *GLASS BUILDINGS*

69 Plan and Description of a New Greenhouse erected at Chatsworth, from *Paxton's Magazine of Botany*, Vol II, 1835
Photographs
A detailed record of the fruits of Paxton's first series of experiments in glass house construction, using his ridge-and-furrow roof principle. The main parts of the roof were of wood, with interval supports of cast-iron, hollowed to take lead rain-water pipes leading from the wooden Paxton gutters of the roof, which served both structural and drainage purposes. The slatted floor was of wood so that dust could be swept through, and the sliding sides permitted of ready access at any point.

70 The Peach House, Burton Closes, Bakewell
Photographs by Edward Hubbard
A house backing on to a garden wall, rather like the still-surviving Conservative Wall which runs between the house and the stables at Chatsworth, except that here (unusually for Paxton) the greater part of the structure was of cast-iron, not wood. The resemblance of the sliding sides to the Chatsworth greenhouse is marked, but the roof (again unusually) does not seem to have been of Paxton's standard ridge-and-furrow pattern. Now demolished.

71 Conservatory, Burton Closes
Photograph by courtesy of Professor Marcus Whiffen
Shows the elegant Paxton roof of the conservatory, now removed; the walls were of masonry, the front wall of glass with stone mullions.

72 Letter from Paxton to Messrs Boulton & Watt, July 20, 1836. Drawing of Boiler House, Chatsworth
Two photostats by courtesy of Boulton and Watt Collection, Birmingham Public Library
Photostat copies of a letter complaining of the performances of an engine supplied to Paxton for working his newly modified sash-bar machine, and a drawing of the boiler and engine house in the Sawmill yard at Chatsworth. Paxton had experimented with different sash-bar and other wooden sections for several years and, realizing that mass production of standard components was the key to rapid and accurate assembly of larger buildings, evolved appropriate cutters for use in a steam-operated slotting machine that he had adapted. The machine was first used for grooving sash-bars, but was altered to make the bars completely. Paxton was awarded a Silver Medal by the Royal Society of Arts for his invention in 1840.

73 Accounts for the Great Conservatory 1836–40
MS account books, 2 vols., bound green morocco
A separate account was kept for the Great Conservatory or Great Stove (i.e. Hot house), and the progress of the work can be followed in detail from the first entry on January 12, 1836 to 'John Marples—for making the Model—£38 15s 0d', to the final entries for 'Terrace Walls and Carpenters' Work at the Entrance Doors' in 1841. The total cost of the Great Stove was £33,099 10s 11d.
Lent by The Trustees of the Chatsworth Settlement

74 Door stopper
Metal casting modelled on the Great Stove. 17x9
The model made by John Marples for Paxton, to show the Duke what Paxton had in mind perhaps, or possibly to try alternative arrangements in miniature, has disappeared, but the door stopper remains as an amusing reminder of this great building, now that it has gone.
Lent by T. W. Tallents, Esq.

75 Chatsworth: four drawings of the (Great) Conservatory, initialled *D.B.*, and dated July 1836
24x32 each
This set of drawings, together with a letter from Decimus Burton (1800–81) to the Duke of Devonshire, have given rise to the claim that it was Burton who designed the Great Stove, not Paxton. They are dated at least some six months after work had actually begun on the building, however; and in any case may have been prepared at Chatsworth and merely approved by Burton, as it may have been the Duke's desire to have a second opinion on this great venture. The structural system is definitely Paxton's: the laminated wooden curved members, (he had built at least two curved houses before this); the Paxton gutters, the ridge-and-furrow roofing, the hollow columns to take surface water away: all these are due to Paxton's earlier experience. No one had built a glass house of this kind and

size before: 277 feet long, 123 feet wide, and 67 feet high, with a main span of 70 feet. The curvilinear ridge-and-furrow form was to remain unique, too, for when Burton designed the still-extant Palm House at Kew, in conjunction with Richard Turner, iron founder and engineer, it was of conventional curvilinear pattern, and moreover was of iron throughout, not wood.
Lent by The Trustees of the Chatsworth Settlement

76 Letters from Sarah Paxton to Joseph, dated June 5, 1837, and March 16, 1839
Markham Papers
The first of these letters refers to: '. . . the London architects. J. Marples says Mr Wren is far before them, they are gaining experience at your expense'—an illusion to Burton, presumably, 'Mr Wren' being Paxton. The second letter refers to 'the Foreman have completed the work you laid out' in regard to the Stove.
Lent by The Trustees of the Chatsworth Settlement

77 Exterior view and three views of the interior of the Great Stove prior to demolition, *c.* 1920
Plate V
Photographs
The Great Stove proved too expensive to heat after the Great War (1914–18), and it was demolished by dynamite, the structure still being sound. The photographs show the exotic contents in process of removal and demonstrate also the spatial qualities of the building, through which the Duke could ride in his carriage.
Lent by The Trustees of the Chatsworth Settlement

78 Letter from Paxton to John Walker, horticultural builder, dated April 30, 1838
Markham Papers Photostat
The letter includes a sketch of the Great Stove and asks for an estimate for apparatus to heat the building.
Lent by Dr G. F. Chadwick

79 Chimney Stack for the Great Stove
Photograph by Dr G. F. Chadwick
This stack still survives some way up the hillside east of the position of the former Stove, having been linked to it by a conduit.

80 The Great Stove under repair
Photograph
A nineteenth-century photograph which shows the details of the construction of the side 'aisles'.
Lent by Edward Hubbard, Esq

81 West elevation of Capesthorne, Cheshire and Interior view of Capesthorne Conservatory, 1843
Watercolours by J. Johnson, 1843
10½x14, 10½x12 L
These views were commissioned after the rebuilding of Capesthorne by Edward Blore in 1837 for Edward Davies Davenport. The Davenports were friends of the Cavendishes, and it is likely that Paxton designed the conservatory at Capesthorne before 1838. This glass-house is of considerable interest as it shows the use of curved, wooden members (as in the Great Stove) but to support a flat-pitched ridge-and-furrow roof, not a curved one. The columns and beams were of iron.
Lent by Lt-Col Sir Walter and Lady Bromley Davenport

82 *Victoria Regia* lily house, Chatsworth
(*Civil Engineer and Architect's Journal*) Photograph
A plan (the tank is circular), sectional perspective, section and elevation of the house built by Paxton in 1850 to house the ever-expanding lily which he had flowered a few months earlier. The house was close to Barbrook. Here, Paxton brought his glass house system to its greatest refinement, introducing a flat ridge-and-furrow roof carried by iron cross-beams on elegant columns: the sides of the house are developed from earlier greenhouses, but the favourite round-headed arch motif is introduced from conventional architecture.

83 Lily House: Chatsworth
Three photographs
Two nineteenth-century exterior views of the Lily House, and one of its interior showing the structural system, and its *raison d'être*.
Lent by Edward Hubbard, Esq

VI *THE GREAT EXHIBITION BUILDING*

84 Building for the Great Industrial Exhibition, to be erected in Hyde Park
(*Illustrated London News*) Photograph
The official design for the Building for the Exhibition of the Industry of All Nations in 1851, as published in *Illustrated London News* on June 22, 1850. The design was prepared by the Building Committee of the Exhibition Commissioners after 245 designs received in an open competition had been discarded. The Committee's design quite ignored the main requirements of their own competition: an economical building, capable of quick erection and equally quick demolition, for the site allocated in Hyde Park (and still the subject of fierce controversy) had to be returned to its original state. A vast edifice of brick, with an iron dome, scarcely answered the problem.

85 Sketch in ink on blotting paper by Joseph Paxton, done at Derby, Tuesday June 11, 1850, together with a railway telegram from Paxton in London to his wife at Chatsworth, dated July 15, 1850, announcing the success of his design
Original in the Victoria and Albert Museum
Photograph
On June 7, 1850, Paxton was in conversation with John

Ellis, MP, at the House of Commons and mentioned the rumoured failure of the Exhibition Building: 'I told him I had a notion in my head, and that I would ascertain whether it was too late to send in a design.' (Paxton's speech to Derby Mechanics' Institution, October 1850.) Ellis knew Paxton well (both were Midland Railway directors) and took him to see Henry Cole of the Commissioner's Executive Committee. Specifications for the official design were being prepared, but the Committee were willing to introduce a clause allowing tenders for their design to submit an alternative design with a tender for that alternative—a procedure which seemed to show a certain lack of confidence by the Commission in its own design. Immediately after seeing Cole, Paxton went north to see Robert Stephenson float into place the third tube of his Menai railway bridge on Monday, June 10. He returned to Derby on the following day, where he did the sketch end elevation and cross-section which was to form the basis of his design. He returned to Chatsworth, and the very next day he wrote to the Secretary of the Society of Arts offering to give a lecture the following week on the as yet unprepared scheme! (The lecture actually took place on November 13.) Paxton spent eight days of continuous work to complete his drawings with the assistance of his Chatsworth staff, and with W. H. Barlow, resident engineer of the Midland Railway helping with the calculation of column and girder strengths on June 15. On June 20 the plans were ready, and Paxton set off with them for London.

86 Perspective view of the proposed building for the Great Exhibition of 1851, watercolour, inscribed in pencil: *J. Paxton . . . Arch. Chatsworth, Barbrook Villa*, 1850
22 x 28½
The perspective prepared as part of Paxton's submission to the Commissioners, subsequently used as the basis of the engraving published by Paxton in *Illustrated London News* on July 6, 1850, together with his own description of the proposed building.
Lent by the Victoria and Albert Museum

87 Letters from Joseph Paxton, in London, to Sarah, dated: June 22, 23, 24, 25, July 6, 12 (2), 13, 15 (2), 23 and November 26, 1850 and January 21, 1851
Markham Papers
In the first letter Paxton describes how he fell in with Robert Stephenson at Derby, and showed him his drawings in the train to London: Stephenson was 'quite delighted'. In the second letter Paxton mentions going to see Robert Lucas Chance, the Birmingham glass-maker, to aid him in submitting a tender, and refers to the newly-published Commissioners' design: 'Barry has his own child which you see in the *London News* is an abortion.'

Subsequent letters chart Paxton's hopes and fears in the negotiations, culminating in the telegram of July 15 announcing his victory, and the letter of the same date in which he asks for the church bells to be rung in all the estate villages; (perhaps a forgivable vanity).

The letter of July 23 quotes 'The Old Duke' (of Wellington) as saying: 'I knew it would all come right as soon as I heard you had it in hand.'

The letter of November 26 has a charming coloured heading of the Great Building as completed, and was presumably site office notepaper.
Lent by The Trustees of the Chatsworth Settlement

88 Estimates of erection, MS (undated)
Markham Papers
Two surviving draft estimates (the first is rougher in form) for the erection of the 1851 Building by Paxton, Chance, and Fox & Henderson, *c.* June 29, 1850.
Lent by The Trustees of the Chatsworth Settlement

89 Improvement to roofs: Drawing from Specifications of Patents: Building Materials, Vol 184, 1850, No 13, 816
Photograph by Dr G. F. Chadwick
Robert Chance entered an application on Paxton's behalf for a patent for the form of roof construction used in the 1851 Building, which was based on the small-scale application in the Chatsworth Lily House.

90 The Royal Commissioners for the Exhibition of 1851: the official oil painting by H. W. Phillips (1820–68)
Original at Victoria and Albert Museum
Photograph
The Prince Consort is seated, with Paxton standing and leaning towards him with his hands on the table: Charles Fox stands immediately left of Paxton. Henry Cole is the right hand figure of the left hand standing group. Lord Derby (sitting right) has hand on model of Great Stove.

91 General view of the Great Industrial Exhibition Building 1851 under construction
(*Illustrated London News*) Photograph
The iron frame, of standard components throughout, based on a 24 feet grid.

92 Raising the ribs of the transept roof, Great Industrial Exhibition building 1851.
(*Illustrated London News*) Photograph
The transept was added to Paxton's design to roof over a group of elms on the site. The curved ribs were of laminated wood, derived directly from the Chatsworth Great Stove. Fox and Henderson are seen directing the operation.

93 The Sash-Bar Machine for the Great Industrial Exhibition building 1851
(*Illustrated London News*) Photograph
An improved version of Paxton's 1836 machine.

94 Various items of machinery used for the Great Industrial Exhibition, 1851
(*Illustrated London News*) Photograph
All components for the building were mass produced, in the case of much of the wood-work on the site. Machinery was used for every possible operation of manufacture and assembly.

95 Roof glazing and machinery for the Great Industrial Exhibition building, 1851
(*Illustrated London News*) Photograph
The roof assembly system was derived from that used earlier on the Chatsworth Great Stove, using ingenious glazing trolleys which ran in the Paxton gutters.

96 Roof view of the Great Industrial Exhibition building, 1851
(*Illustrated London News*) Photograph
The completed roof: 18 acres of glass to Paxton's patent system, and drained via the hollow supporting columns as in his earlier greenhouses at Chatsworth.

97 Ground plan of the Great Exhibition building, 1851
(The Architectural Press) Photograph

98 The 'standard' view of the 1851 building: from *Comprehensive Pictures of the Great Exhibition of* 1851, Vol. II, Plate I
Photograph
Shows the centre transept added to Paxton's original design to enclose the elm trees.

99 The 'aeronautic' view of the 1851 building, drawn and lithographed by Charles Burton
Photograph
The great building in its setting. Note the separate boiler house for working exhibits.

100 Bird's eye view of the Great Exhibition from the south, 1851. Lithograph
33¼x47
Lent by the Victoria and Albert Museum

101 View from the north bank of the Serpentine, looking north-west, 1851. Lithograph
24x32½
Lent by the Victoria and Albert Museum

102 Interior of the Great Exhibition building 1851, drawn by W. B. Brounger and engraved by R. P. Cuff
Plate IV
18x25
Shows the fine spatial qualities of the building before the exhibits were introduced.
Lent by RIBA Library Drawings Collection

103 View of Transept looking south, 1851.
Calotype photograph from *Exhibition MDCCCLI, Reports by the Juries*, 1852, Vol. 2.
Lent by the Victoria and Albert Museum

104 Un-named and undated pencil elevation of a semi-circular transept with supporting side quadrants
24x32
This drawing may relate to a suggestion that the 1851 building should have an arched nave, or to the later redesign of the building for erection at Sydenham in 1852.
Lent by The Trustees of the Chatsworth Settlement

105 *The building erected in Hyde Park for the Great Exhibition* etc. 1851, by Charles Downes, with descriptions by Charles Cowper, 1852
The fine plates of the working drawings originally by Charles Fox, who re-drew Paxton's first plans.
Lent by the Victoria and Albert Museum

106 Copy letter from Lord John Russell to Paxton, October 15, 1851
Markham Papers
The Queen proposes to Knight Paxton for his work on the Great Exhibition.
Lent by The Trustees of the Chatsworth Settlement

107 A cartoon from *Punch* showing Prince Albert handing Paxton a slice of the Exhibition profits, October 25, 1851
(*Punch*) Photograph
Paxton was actually awarded £5,000.

108 *The House that Paxton Built*
NOT EXHIBITED
Markham Papers
A charming children's picture history of the events of 1850–1. Mr Paxton in his dressing gown!
Lent by Miss Persis Tallents

109 View of the Crystal Palace as proposed to be altered into a winter garden by Sir Joseph Paxton. Lithograph dated October 15, 1851, 33½x47
The 1851 building had been christened the 'Crystal Palace' by *Punch* late in 1850, and the name became widely used. (The sixth Duke insisted on *Chrystal* Palace in his Diary.) Paxton fought hard to retain the building in Hyde Park after the Exhibition had closed: indeed he had this in mind in conceiving his design. The lithograph shows extensions to the ends to form enclosed courtyards for sculpture and open air display; the towers are for heating and ventilating apparatus.
Lent by the Victoria and Albert Museum

110 Proposed site for the Crystal Palace in Battersea Park, dated August 9, 1851, and initialled E.S.P.C. Lithograph 18 in × 30 in.
Various sites for the rebuilding of the Crystal Palace were suggested in 1851 and 1852, mainly being promoted by railway companies. Battersea Park had not then been laid out, and the proposal to re-erect the Crystal Palace there was associated perhaps with the park project.
Lent by Dr G. F. Chadwick

111 Design for roofing the Royal Exchange, London: interior view
(*Architect and Building News*) Photograph
Paxton was encouraged to make this proposal in 1851 to roof the Exchange court by the Rothschilds and others, but nothing came of it.

112 Crystal Sanitarium, London Chest Hospital, Victoria Park
(*Illustrated London News*) Photograph
Paxton prepared this scheme in June 1851: a large conservatory 200 feet long and 72 feet wide, using his patent roof system. The towers carried flues, the building promising to be completely air-conditioned, but it was not built.

113 Great Victorian Way, proposed by Sir J. Paxton, MP and referred to in his Evidence June 7, 1855. Plan from the *Report of the Select Committee on Metropolitan Communications*
Photograph by Dr G. F. Chadwick
Paxton's greatest town planning scheme: a continuous arcade with railways and roads running round the centre of London and the West End, linking all the main railway termini.

114 Sectional perspective of the Great Victorian Way, inscribed: *Joseph Paxton, Sydenham*, 1855. Pencil and wash
60x48
The survivor of a number of drawings prepared by Paxton to explain his project to the Select Committee. The arcade was to be 72 feet wide, 108 feet to the top of the arch. The railways would be at least 24 feet above ground to avoid obstructing the streets, and would be separated from the buildings by double walls to avoid noise transmission. Shops, private houses, hotels, and places for entertainment would be included.
Lent by G. I. Larkin, Esq, TD, FRIBA

115 Drawing of Paxton's portable glasshouse, from *Specifications of Patents, Agriculture etc*, Vol 81, No. 1420
Photograph by Dr G. F. Chadwick
Paxton's smallest glass building system was also one of his most successful, selling as 'Hot Houses for the Million' produced under patent by various manufacturers.

VII *THE CRYSTAL PALACE AT SYDENHAM*

Note: All photographs from No 121 onwards have been lent by Alan R. Warwick, Esq unless otherwise stated.

116 The Crystal Palace, Park and Grounds, Sydenham, 1852
(*Civil Engineer and Architect's Journal*) Photograph
A plan taken from an early layout of the Sydenham site. Parliament had voted for the removal of the 1851 Building from Hyde Park on April 29, 1852, but as early as April 7, Paxton had secured a capital of half a million pounds to float a company to buy the Exhibition Building (which was still the property of Fox, Henderson and Co, and in effect was only leased by the Royal Commission), and to purchase a new site. On May 13, the building changed hands and the new Crystal Palace Company published a prospectus on May 17, 1852. The Directors included as Chairman Samuel Laing of the London Brighton and South Coast Railway, and Francis Fuller, Scott Russell, Digby Wyatt—all of whom had some connection with the 1851 building in one way or another—as well as Paxton himself. Paxton became responsible for the design and erection of the new building, Wyatt and Owen Jones for decorations, and C. H. Wild became engineer; Fox and Henderson were contractors for the re-erection of the building. The 1851 building was purchased for £70,000, (the Commission having paid the equivalent of a halfpenny a cubic foot for its use), and Fox and Henderson undertook to re-erect it on a new site for £120,000. Penge Place and adjoining land at Sydenham in Kent were selected as the site: 349 acres in all, 200 acres being appropriated for the new building and its park and 149 acres being sold for building. The plan shows the latter area laid out as a villa suburb, together with the general arrangement of the Palace and grounds. The Crystal Palace Hotel did not materialize, but from the first the railway connection with the LBSCR was of vital importance. The layout of the great formal lakes was subsequently altered.

117 The Crystal Palace at Sydenham as completed
(*Illustrated London News*) Photograph
Paxton determined to make the new Crystal Palace more complete, as well as permanent on its new site. To the earlier flat nave he added a vault, and the central transept was raised above the nave and enlarged, subsidiary north and south transepts being added. Because of the sloping site a basement storey was necessary, so that the three storey building became a four-storey one, and in the centre six storeys were necessary. The ground area was reduced to nearly 600,000 square feet, but the cubic content was nearly 50 per cent greater than the 1851 building, and the glass surface nearly doubled. Early estimates of about £350,000 for the whole building and park quickly doubled and then trebled as work proceeded: over £1,230,000 had been spent by the middle of 1855.

118 The Crystal Palace, Sydenham, showing the improvements suggested by Sir Charles Barry. From: *The Life of Sir Charles Barry* 1867
Photograph
An unsolicited design; adding towers and domes to the clean outline of Paxton's building.

119 Crystal Palace and Park, Sydenham, on the occasion of its opening by the Queen, June 1854; lithograph signed by Sir Joseph Paxton, from a drawing by J. Harding. (1798–1863) 50 x 27
The completed ensemble of building and park. The water towers were re-erected to a modified design.
Lent by Dr G. F. Chadwick

120 The ground plan of the Crystal Palace
Photograph

121 The brick foundations of the main building
Photograph by Delamotte, 1853
Philip H. Delamotte kept a complete photographic record of the progress of the Crystal Palace works at the request of the Directors, published in 1853.

122 Arrival of materials and sections at Sydenham from Hyde Park
Photograph by Delamotte, 1852

123 Scaffolding for centre transept ribs, looking north
Photograph by Delamotte, 1852
The transept ribs were newly made for Sydenham, being of iron instead of timber.

124 South wing under construction, looking towards the Rosery
Photograph by Delamotte, *c.* 1852

125 The south wing
Photograph by Delamotte, *c.* 1854

126 The south tower under construction
Photograph by Delamotte, *c.* 1854
The towers were built and then taken down and re-erected, I. K. Brunel advising on their construction. They carried water tanks for the 250 feet fountain jets as well as the flues from the many boilers below the Palace floor, in the basements.

127 The north transept
Photograph by Delamotte, *c.* 1853

128 North end of the nave from the centre transept
Photograph by Delamotte, 1853

129 South end of the nave from the interior
Photograph by Delamotte, 1854

130 Interior of the nave looking north
Photograph by Delamotte, 1854

131 The roof of the Crystal Palace from the centre transept looking towards the south tower
Photograph, *c.* 1912

132 South transept looking towards Penge
Photograph by Delamotte, 1853

133 South transept seen from the Lower Terrace
Photograph by Delamotte, *c.* 1854

134 Centre transept seen from the Lower Terrace
Photograph by Delamotte, 1854

135 North transept seen from the Lower Terrace
Photograph by Delamotte, 1854

136 Osler's Glass Fountain in the south transept
Photograph by Delamotte, 1854

137 The Park and gardens of the Crystal Palace as laid out
Photograph

138 The gardens showing the south transept
Photograph by Delamotte, 1854

139 The water temples
Photograph, 1904
The iron temples and cascades were no doubt inspired by the eighteenth century cascade and (masonry) cascade house at Chatsworth.

140 View of the Crystal Palace seen from Anerley Hill and corner of Thicket Road
Plate VIII
Photograph

141 Osler's Crystal Fountain and the Great Clock in the south end of the nave
Photograph by A. Talbot, *c.* 1935

142 The Open Colonnade early in 1854, containing two figures. Figure holding plans may be Paxton
Photograph by Delamotte

148 The Colossi of Abu Simbel in front of the end of the north transept
Photograph by Delamotte, 1854
The Palace contained courts and various architectural styles as part of a permanent exhibition intended to have serious educational value. The grounds contained statuary and geological specimens and plaster casts of prehistoric animals for the same purposes.

144 Preparing the stage for the Royal opening, centre transept
Photograph by Delamotte, June 1854

145 The opening ceremony by Queen Victoria in June 1854
Photograph by Delamotte

146 Inauguration of the Great Fountains at the Crystal Palace, 1856
(*Illustrated London News*) Photograph
The complications of the Sydenham waterworks were considerable, and the full system was not displayed until June 18, 1856, before the Queen. Nearly 12,000 fountains jets were provided, using about 120,000 gallons a minute.

147 Banquet given by Sir Joseph and Lady Paxton in the Crystal Palace, 1860
(*Illustrated London News*) Photograph

148 Crystal Palace Parade, looking north, *c.* 1906
Photograph

149 Palais de Cristal, St Cloud, Paris, watercolour signed *Joseph Paxton*, 1852
18¾ x 48¼
The only survivor of a number of drawings prepared by Paxton *c.* 1861 and left at an address in Paris and subsequently lost. The culmination of the long progression of development from the humble greenhouse at Chatsworth, via the Great Stove and the Lily House, to the two built Crystal Palaces and the project for the Great Victorian Way. The use of curvilinear forms, although foreshadowed in much earlier designs, represents a further advance on this scale in Paxton's techniques.
Lent by Yale University Art Gallery. Gift of Yale University Art Gallery Associates

150 Palais de Cristal, area of building. MS
Markham Papers
Lent by The Trustees of the Chatsworth Settlement

151 French Crystal Palace: MS estimate
Markham Papers
Lent by The Trustees of the Chatsworth Settlement

ADDENDA

I. PAXTONIANA

152 Alternative design for the projected memorial to Joseph Paxton by Owen Jones, watercolour, 25¾ x 11
Lent by the Victoria and Albert Museum

VI THE GREAT EXHIBITION BUILDING

153 The Great Industrial Exhibition, lithograph, 13 x 37¾. Inscribed *Rosa Paxton from her affectionate father, Joseph Paxton, Feb* 14, 1851
Lent by T. W. Tallents, Esq.

154 Two contemporary hand-coloured prints of the Great Industrial Exhibition, 3 x 5¾, 4 x 6
Lent by T. W. Tallents, Esq.

155 Silver medal commemorating the Great Industrial Exhibition with heads of Queen Victoria and the Prince Consort and *reverse*, the Exhibition building with its dimensions, dia. ½
Lent by T. W. Tallents, Esq.

LIST OF LENDERS

Allcard, R.; *36, 53*
Bromley Davenport, Sir W. and Lady; 81
Buxton, The Borough Engineer; *32*
Chadwick, G. F.; *5, 6,* 10, 12, 15, 16, *45, 65,* 78, 110, 119
Chatsworth Settlement, The Trustees of; 1, 9, *38, 39, 50, 67, 73, 75,* 76, 77, 87, 88, 104, 106, 150, 151
Glasgow, The Corporation of; *35*
Hubbard, E.; 80, 83
Hunt, Mrs M. H.; 7
Larkin, G. I.; 114
Liverpool, The Record Office; 22, 23
London, The Royal Institute of British Architects; 102
The Victoria and Albert Museum; *55,* 86, 100, 101, 103, 105, 109, 152
Markham, M.; 8
Rothschild, Baron G. de; *59, 60*
Tallents, Miss Persis; *66*
Tallents, T. W.; 2, 11, 74, *153, 154, 155*
Warwick, Alan R.; 120–48
Yale, The University Art Gallery; 149

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